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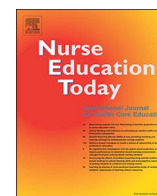
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Trainers' perception of the learning environment and student competency: A qualitative investigation of midwifery and anesthesia training programs in Ethiopia



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A B S T R A C T

Background: Ethiopia has successfully expanded training for midwives and anesthetists in public institutions. This study explored the perceptions of trainers (instructors, clinical lab assistants and preceptors) towards the adequacy of students' learning experience and implications for achieving mastery of core competencies.

Methods: In-depth interviews with 96 trainers at 9 public universities and 17 regional health science colleges across Ethiopia were conducted to elicit their opinions about available resources, program curriculum suitability, and competence of graduating students. Using Dedoose, data were thematically analyzed using grounded theory.

Results: Perceptions of anesthesia and midwifery programs were similar. Common challenges included unpreparedness and poor motivation of students, shortages of skills lab space and equipment, difficulties ensuring students' exposure to sufficient and varied enough cases to develop competence, and lack of coordination between academic training institutions and clinical attachment sites. Additional logistical barriers included lack of student transport to clinical sites. Informants recommended improved recruitment strategies, curriculum adjustments, increased time in skills labs, and better communication across academic and clinical sites.

Conclusions: An adequate learning environment ensures that graduating midwives and anesthetists are competent to provide quality services. Minimizing the human resource, infrastructural and logistical gaps identified in this study requires continued, targeted investment in health systems strengthening.

1. Background

Ethiopia has reduced under-five mortality by two-thirds, trained and deployed a large cadre of Health Extension Workers, and increased the number of health care facilities nationwide (Ayalew et al., 2012; Bilal et al., 2011).

However, the country continues to grapple with a high maternal mortality ratio of 676 maternal deaths per 100,000 live births (Central Statistical Agency, 2012), low utilization of health facilities (approximately 85% of births take place at home) (Central Statistical Agency, 2014), a high rate of fistula incidence (3500 per year) (Dubay and Box,

2013), a high rate of childhood stunting (44% of under-fives), and a high unmet need for family planning (Central Statistical Agency, 2012).

These challenges are exacerbated by a critical shortage of health workers, including midwives and anesthetists. Though the number of midwives increased from 1275 in 2008 to 4725 in 2012 (UNFPA and Ethiopian Midwives Association, 2012), this is still below the 8760 required to ensure that 95% of births are attended by skilled providers (UNFPA et al., 2014). Similarly, estimates suggest that only 19 physician anesthesiologists (Chao et al., 2012) and 252 mid-level anesthetists (Ayalew et al., 2012) serve this population of approximately 95.9 million (Haub and Kaneda, 2014).

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The government has aggressively expanded the number of public institutions training healthcare professionals and implemented approaches that minimize the duration of training. An accelerated midwifery training program provides diploma-level nurses with an additional year of training, upon which they graduate as midwives. Similarly, diploma-level nurses graduate as Level V anesthetists after a one-year program at regional health science colleges (RHSCs) or as bachelor's-level anesthetists after a 2.5-year university program.

Classroom and clinical learning environments—including quality of teaching, supervision, and facilities—are significantly associated with achievement in medical education (O'Sullivan, 2015). Studies of medical school graduates have found that the learning environment is a significant predictor of preparedness for practice (Dijkstra et al., 2015; Tokuda et al., 2010). Multiple survey instruments have been developed and validated to quantitatively assess students' perceptions of diverse health sciences learning environments (Bigdeli et al., 2015; Brown et al., 2011; Papathanasiou et al., 2014; Tackett et al., 2015; Tokuda et al., 2010). In contrast, studies on trainers' perceptions of the health education learning environment are rare. (Downey and Asselin, 2015; Lockwood et al., 2009). Though trainers' expert opinions offer an important vantage point from which to evaluate the learning environment, qualitative accounts of trainers in low-resource settings are largely absent from the literature.

This qualitative study examines the perceptions of classroom instructors and skills lab assistants who work at training institutions and preceptors who supervise students at clinical practice sites. The study sought to answer the following research questions:

1. How do trainers at midwifery and anesthesia programs perceive the learning environment for facilitating mastery of selected core competencies?
2. How do trainers perceive the competence of anesthesia and midwifery students at graduation?
3. What changes do trainers recommend to improve the competency of students who graduate from midwifery and anesthesia programs?

2. Methods

2.1. Study Design

The study was a baseline of a pre-post evaluation study to determine whether interventions under the USAID-funded Strengthening Human Resources for Health (HRH) Project improved the competence of midwifery and anesthesia graduates. A qualitative analysis, using grounded theory, was conducted using in-depth interviews with instructors and skills lab assistants at public midwifery and anesthesia training programs and preceptors at clinical practice sites.

2.2. Sampling

A total of 31 universities and 25 RHSCs in the public sector were providing health science training when these data were collected. This study was limited to institutions that graduated students from midwifery and/or anesthesia training programs in 2013; Exclusion criteria included inaccessibility, inadequate information on graduation status, or unavailability of students. The study sample was therefore limited to 26 institutions: 9 universities and 17 RHSCs.

The 26 institutions sampled were drawn from six of Ethiopia's nine regions (Amhara, Benshangul Gumuz, Harari, Oromia, Tigray, and Southern Nations, Nationalities and Peoples) and one of the country's two city administrations (Addis Ababa).

We conducted in-depth interviews with one instructor, one skills lab assistant, and one preceptor at each of 32 programs (78 informants associated with midwifery programs and 18 with anesthesia programs) (Table 1).

2.3. Data Collection

Separate interview guides for instructors, skills lab assistants and preceptors were developed by HRH Project staff. In-depth interviews were conducted in December 2013 over a three-week period, and scheduled based on informant availability. Data collectors probed for information and opinions regarding the curriculum, assessment methods, clinical competence of graduating students, staffing and equipment, and challenges to teaching and learning. Interviews were conducted in Amharic and ranged in length from 40 to 75 min (average: 50 min). Each interview was tape-recorded, and data collectors took notes.

2.4. Data Management and Analysis

Recorded interviews were transcribed and translated into English by a private research company. Recordings of transcripts from three institutions (one anesthesia university program, one HSC with both anesthesia and midwifery, and one HSC midwifery program; 9 total transcripts) were inaudible, resulting in a smaller sample size (29 programs at 24 institutions; 87 interviews) than originally planned. Interview transcripts were analyzed using an inductive grounded theory approach and Dedoose qualitative data analysis software (www.dedoose.com). A co-author developed an annotated codebook of 22 nested codes based on emergent themes related to the research questions. As data was coded, iterative memo-writing and dialogue with other co-authors helped to refine the code structure, collapsing and expanding codes and sub-codes to refine and describe emerging themes. The coding process resulted in more than 2800 code applications. Coded excerpts for each theme were circulated to the other co-authors to ensure passages were coded appropriately, and checked for completeness of coding using text search spot-checks and graphical code application matrices in Dedoose.

2.5. Confidentiality and Ethical Considerations

Field notes and transcripts were kept on secured computers. Although institution names were preserved to assist in the detection of patterns, no personal identifiers of informants were retained in the transcribed text. Once uploaded to Dedoose, data were secured with an encryption key known only to the primary coder.

The study protocol was approved by the Johns Hopkins School of Public Health (JHSPH) Institutional Review Board prior to data collection. Data collectors explained the purpose of the study to all study participants, who were assured that their information would be kept confidential, and obtained oral informed consent from all informants to audiotape their interviews.

3. Results

There were few differences between informants' assessments of anesthetist and midwifery programs and also between universities and RHSCs. We present results for these programs and training institutions together, but note where informants' appraisals differ. Five themes emerged that informants associated with the quality of training and competency of institutions' graduates (Table 2):

3.1. Assessing Student Competency

Institutions use different methods to assess student competency. Three midwifery programs reported having no internal skill assessments, instead relying on feedback from clinical sites (e.g., logbook entries and checklists) to assess students. More established programs tended to report having well-developed and continuous internal assessment methods, often using Objective Structured Clinical Examination (OSCE) to ensure competency prior to sending students

Table 1
Number of instructors, skills lab assistants, and preceptors interviewed.

Type of institution	Midwifery			Anesthesia		
	Instructors	Skills lab assistants	Preceptors	Instructors	Skills lab assistants	Preceptors
University	9	9	9	4	4	4
RHSC	17	17	17	3	3	3
Total	26	26	26	6	6	6

Table 2
Emergent themes.

- Difficulties assessing competency
- Student numbers and caliber
- Curriculum suitability and sequence
- Lack of infrastructure and equipment
- Lack of coordination between academic and clinical sites

to clinical rotations.

Five of the 29 instructors critiqued external assessments, such as the Centre of Competence (COC) exam, asserting that internal assessments were a more reliable measure of students' knowledge and skills:

I have heard that one of our top students failed the [COC] exam because he was told that he didn't inject Vitamin E. This is such a minor thing. You should be able to see the competency of that person; that is, if he misses this, would we lose the mother or the baby? If he misses a core thing, he should fail—that might possibly teach him something. – Midwifery preceptor

Informants' perceptions of graduating students' competency were based largely on observations. Midwifery informants generally agreed that students could effectively manage short-acting contraceptives (16 informants), antenatal care (24 informants), uncomplicated delivery (30 informants) and immediate newborn care (14 informants), but not labor complications (16 informants), instrumental delivery (14 informants), long-acting contraceptives (7 informants), or manual vacuum aspiration/post-abortion care (17 informants). The six anesthesia informants who commented specifically on skill mastery remarked that while intubation/airway management/resuscitation and general anesthesia skills were generally considered good, especially in universities, students lacked competency in spinal/regional anesthesia, often attributed to lack of equipment and supplies in skills labs.

3.1.1. Caliber and Number of Students

Many informants (56 of 87, 64%) were critical of the quality and motivation of students, particularly midwifery informants (52 of 72, 72%).

Most of the time, students joining the midwifery program are those who have poor academic performance. We don't know why they are assigned there...Health science [entering students] join public health, anesthesia, psychiatry and other programs. The remaining students, who are poor students, will join the midwifery program; since the background of these students is not good, it is difficult to make them academically excellent. – Midwifery instructor

Eleven informants suggested basic education reforms, screening procedures, and government-mandated admissions criteria to raise the caliber of entering students. Others recommended allowing students to choose their own field of study, rather than assigning them to programs that do not interest them, though one remarked that recent awareness-building efforts to stimulate interest in midwifery had helped recruit more motivated students.

Informants also complained that the large numbers of students overwhelmed available facilities and staff, particularly in skills labs and clinical rotations:

[You] are supposed to attend at least 200 cases before graduation; previously it was possible to get this number of cases since the total number of students was around 12, so they can work at operation rooms every day, but the number of students is currently 30 or more. Additionally, there are post-basic and MSC students; therefore, getting adequate number of cases will be difficult. – Anesthesia instructor

3.1.2. Curriculum Suitability and Sequence

Instructors (13 of 29, 45%) commonly referred to the teaching-learning approach as “student-centered” and/or “participatory,” although traditional lecture methods were the predominant mode of delivery for theory courses. Several instructors specified that the ideal time ratio of theoretical to practical learning was 70%:30%, but most felt that there was insufficient time for practical skill building, particularly in midwifery programs and at universities.

Reviews of the midwifery and anesthesia curricula content were largely positive, although seven anesthesia informants complained that spinal/regional anesthesia was not covered in the curriculum. Midwifery informants thought the curriculum was lacking in training on long-term contraceptives, Expanded Programme on Immunization, and partograph use. Midwifery informants were also concerned that core coursework was delayed until the third and fourth year of training, too late to build competence during clinical rotations.

Numerous instructors (12 of 29, 41%) voiced skepticism about the new modular curriculum gradually being adopted nationwide, saying it lacks clear guidelines, overlooks important skills, requires additional time (e.g., summer sessions/extra weeks), and is not supported with appropriate materials:

The negative thing is, the modules we have lack guidelines. The teachers have problems due to this. They usually download it from the internet. There are times where they don't get everything. That is our challenge. When the curriculum comes it should come with modules and manuals. – Midwifery instructor

A few informants (2 preceptors and 2 instructors) considered the curriculum adoption process neither consultative nor culturally sensitive:

The major problem is curriculum design because it does not include the important context of our country. Most of the time, we are not involved or requested to give our opinions to improve the curriculum contents. We usually have problems translating this curriculum into practice and teaching it. – Anesthesia preceptor

3.1.3. Lack of Infrastructure and Equipment

With few exceptions, deficiencies in infrastructure and equipment were universal. Eighty-three percent of training programs (24 of 29 programs) said they had insufficient numbers of simulation mannequins in skills labs. Several of the newer and smaller academic institutions (5 of 24 institutions) either lacked a skills lab or had just one lab for the use of multiple training programs:

Normally, students should practice in a skills lab before they perform intubation on a real patient. But here they are directly exposed to real patients under our strict supervision... We don't have a skills lab, but a

lot of things could be changed if we had one. – Anesthesia skills lab assistant

At clinical practice sites, there were reports of lack of supplies resulting in altered standard of care and missed opportunities to develop student competence:

We teach the science on regional, spinal and auxiliary anesthesia. There are also cases, but when we enter to perform on the cases, materials are not available. So, we opt to perform general anesthesia. – Anesthesia preceptor

3.1.4. Lack of Coordination between Academic and Clinical Sites

A major concern voiced by many preceptors (26 of 29 preceptors, 90%), was the challenge of matching students with clinical rotation sites that ensure hands-on exposure to an adequate number and diversity of cases:

Students are well exposed to postnatal care, postnatal physical examination and newborn assessment as there are enough cases. Newborn resuscitation, immediate newborn care, labor and delivery are so scarce that a student may graduate even without touching one. – Midwifery instructor

Students may not perform the minimum required number of deliveries (for midwifery) or intubations (for anesthetists). Informants worried that limited clinical experience impacts student competence, particularly in more complicated cases.

Absence of case variety limits students from gaining skills. They perform only routine cases. – Anesthesia instructor

Half of the programs (14 of 29 programs, 48%) reported transportation challenges (cost and logistics) in assigning students to institutions where there are adequate cases. Preceptors also felt hampered by insufficient coordination with instructors and administration: they complained that they were not introduced to students or informed of their training needs, were not given guidelines to evaluate students, and rarely had clear information about who was responsible for paying for or providing equipment and supplies that students used.

4. Discussion

This study highlights how deficiencies in the learning environment limit students' development of core competencies in both midwifery and anesthesia programs in Ethiopia. In a recent evaluation, graduating midwifery students in Ethiopia scored just 52%, on average, on an OSCE exam (Yigzaw et al., 2015), while graduating anesthesia students scored an average of 61% (Kibwana et al., 2016). Our informants' concerns and suggestions point to opportunities to improve the learning experience and, ultimately, the competency of midwifery and anesthesia students.

4.1. Student Selection

Expanding the ranks of essential health cadres in low and middle income countries requires an adequately prepared and motivated pool of potential candidates (Feldacker et al., 2014). Studies show that targeted recruitment positively affects student selection and retention (Currie et al., 2007; Kaye et al., 2010). Yet students in Ethiopia do not choose particular health professions; rather, they are assigned based on qualifying scores on eligibility examinations (Fullerton et al., 2011). In Ethiopia, lower-scoring students are typically assigned to midwifery studies (Adegoke et al., 2013), an additional challenge for achieving competency during training (Fullerton and Leshabari, 2010). Our informants' complaints about students who lack motivation and basic literacy suggested that the aggressive scale-up of training programs may have outstripped the availability of informed, prepared potential

students.

Formal admission criteria, including literacy minimums, entrance examinations, and/or an in-person interview or written statement of interest in the program could facilitate the selection of applicants with greater potential to achieve clinical competency.

4.2. Curriculum and Assessments

Health training curricula must strike a balance between theory, demonstration, and clinical experience (Fullerton et al., 2011; Mumbo and Kinaro, 2015), but few training institutions in low-resource settings engage in regular curriculum development and review. In Ethiopia, adoption of a standardized modular curriculum has allowed for condensed training of multiple levels and specialties of students at the same time, while minimizing training duration; accelerated training programs have increased midwives by at least one-third (Ayalew et al., 2012; UNFPA and Ethiopian Midwives Association, 2012).

Ideally, curricula should balance national priorities with international competencies (Mumbo and Kinaro, 2015), and adaptation of curricula should be informed by a detailed assessment of institutions' strengths and weaknesses (Freistadt et al., 2014). Curriculum reviews should also ensure that the sequence of coursework and rotations builds clinical skills in a logical order (Bluestone et al., 2013). Core midwifery- and anesthesiology-specific courses should ideally be offered earlier than the final year of a four-year degree program.

Assessment is a cornerstone of competency-based approaches to health professional education (Frenk et al., 2010); Coordinated efforts to develop and disseminate standardized tools and training materials could help programs develop appropriate assessment instruments (Mumbo and Kinaro, 2015).

4.3. Infrastructure, Equipment and Clinical Skills Labs

Shortages of essential equipment, supplies, and human resources in health training institutions pose a problem across LMICs (Cherian et al., 2010; Rason et al., 2010), and our findings show that Ethiopia is no exception. Our informants vividly described how rapid growth in the number of students has exacerbated these problems, particularly with regard to the time and space available for practice in skills labs.

Adequate skills lab experience prior to clinical rotations builds student confidence and capacity to handle difficult cases, allows an opportunity for quantitative assessment using OSCEs, and relieves pressure on clinical preceptors (Johnson et al., 2013; Matveevskii and Gravenstein, 2008; Walsh et al., 2009). Simulation training has been associated with marked improvements in knowledge, skills, and clinical performance of health workers, as well as moderate improvement in patient-related outcomes (Cook et al., 2011; Cooper et al., 2012; Frenk et al., 2010).

Multiple complaints by our study informants about deficient infrastructure, equipment and skills labs highlight a priority area for improvement. Access to existing skills labs could be expanded either by hiring more skills lab assistants or appointing student volunteers to provide supervision during evenings or weekends.

4.4. Linkages between Academic and Clinical Sites

Coordination between academic and clinical training sites is essential to student supervision, mentoring, case exposure, and competency, but it has been largely overlooked in the literature (Pitts et al., 1990; Snyder et al., 2010). The training programs that our informants viewed most favorably, and which they associated with producing the most competent graduates, were those that maintained close coordination with clinical practicum sites.

Our informants confirmed earlier findings that limited resources for transportation to clinical sites poses an important barrier (Ayalew et al., 2012), but they also highlighted how safety concerns may restrict the

hours during which students—especially females—can attend cases. Creating a practicum transport fund, providing nighttime local transport, and/or building dormitories on hospital grounds or nearby can help overcome these barriers. Supporting night shift service improves case flow and reduces overcrowding, which offers the added benefit of ameliorating patient privacy concerns; however, this will also require additional preceptors (Fullerton and Leshabari, 2010).

Matching students to clinical rotation sites in appropriate numbers, at appropriate times, and with knowledgeable preceptors requires careful coordination (Freistadt et al., 2014; Fullerton and Leshabari, 2010). Stakeholders might consider the feasibility of developing systems to place students at rotation sites to reduce inter-institutional overlap and ensure adequate case flow.

4.5. Study Strengths and Limitations

This is one of the first studies to investigate perceptions of the learning environment among trainers of medical cadres in low-resource settings. The study was conducted nationally, only excluding institutions that were not graduating students at the time of the study. However, potential limitations may limit the transferability of the study findings. Interview discussion guides were only minimally pretested during data collectors' training, but interviewers had been well trained, so the transcripts bore no indication that informants failed to comprehend the questions. The smaller number of anesthesia training programs in Ethiopia (compared to midwifery programs) led to fewer interviews from this area; this imbalance is reflected in the relative dearth of quotes from anesthesia programs. Technical problems with the recordings from three institutions led to a smaller sample size than planned. While some variability was lost due to this mishap, we were still able to detect common themes across the data as well as a wide range of opinions.

5. Conclusions

Rapid increases in the number and size of training programs for health professionals in LMICs demand intensive material and human resource inputs. Our study found widespread deficits in the learning environment of midwifery and anesthesia training programs in Ethiopia. Opinions of the curriculum, skills labs, and clinical practicum were predominantly critical, citing crowded programs with unmotivated students, under-equipped skills labs, and poorly coordinated clinical sites that do not promote adequate case exposure and opportunities to develop clinical competencies. Informants' assessments of the learning environment suggest that these deficits threaten students' mastery of core competencies. Midwifery and anesthesia informants had largely similar concerns.

Investment in human resource capacity-building for health in Ethiopia and other low-resource countries is a step in the right direction to strengthen health systems. However, there is a need for targeted investments – for example, in infrastructure and supplies at under-equipped training institutions and in new teaching materials suited to the local context—but also for new models and approaches to recruit qualified students, assure sufficient clinical experience for students, and promote communication between academic and practical sites.

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